

**REMARKS****Introductory Comments:**

Claims 1 through 24 are pending in the application. Claims 16, 17, 18, and 19 are rejected under 35 U.S.C. 112, second paragraph, for failing to particularly point out and distinctly claim the subject matter which the applicant regards as his invention. Claims 1-4, 23, and 24 are rejected under 35 U.S.C. 102(b) as being unpatentable over the admitted prior art of "Smart Virtual Prototypes: Distributed 3D Product Simulators for Web Based Environments", Proceedings of the Fifth Symposium in Virtual Reality Modeling Language, February, 2000; by Marco Salmela, Harry Kyllönen (herein after "Salmela"). Claims 7-8 are rejected under 35 USC 103(a) as being unpatentable over Salmela in view of US 2002/0041287 by Peter G. Engeldrum et al. (hereinafter "Engeldrum"). Claims 5-6, 9-15, and 20 are rejected under 35 USC 103(a) as being unpatentable over Salmela in view of U.S. Patent No. 6,665,854 by Fujiwara et al. (hereinafter "Fujiwara"). Claims 16-19 are rejected under 35 USC 103(a) as being unpatentable over Salmela in view of Fujiwara, and further in view of U.S. Patent No. 6,362,817 by Albert R. Powers (hereinafter "Powers"). Claims 4-6 are rejected under 35 USC 103(a) as being unpatentable over Salmela in view of Fujiwara, and further in view of Engeldrum. Claims 17-19 are cancelled. The Applicant's respectfully request reconsideration of claims 1-16 and 20-24.

**In response to the 35 USC 112 Claim Rejections:**

Claim 16 is rejected because, according to the Office Action, "said VRML database is partially comprised of fiducials" is not clearly defined. Although the

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Applicants feel there is sufficient information already included in the specification for defining fiducials, Applicants nevertheless amend paragraph [0015] to include "fiducial information or fiducial marks include printed artwork features that are created in the same process as circuit artwork. Fiducial marks provide common measurable points for all steps in the assembly process" as is understood in the art. This clarifies that fiducials allow each piece of equipment used for assembly to accurately locate the circuit pattern. Fiducial marks are known in circuit board manufacturing as physical specific points on circuit boards. The Applicants therefore believe that this rejection to claim 16 is hereby overcome. No new matter has been added.

Although claims 17-19 are cancelled, the limitations included therein are added to claims 1, 9, and 23, and therefore, the rejections to claims 17-19 will be addressed such that the amended claims 1, 9, and 23 may be fully understood.

Regarding the rejection of claim 17, according to the Office Action, "said FRML database is partially comprised of reference designators" is not clearly defined. In response to this rejection, Applicants amend paragraph [0015] such that the fiducial information is included in the database to provide an assembler with a common point to serve as a reference designator by which other components are assembled. This clarifies that the reference designator may include coordinate references as grids on the coordinates for a location on a plane, as suggested by the Examiner. No new matter has been added. The Applicants now believe that the rejection to claim 17 is overcome in view of the amendments to the specification.

Claim 18 is rejected because the Office Action found that said VRML database is partially comprised of 2D coordinate location information for components to be assembled on said PCB is not clearly defined. In response to this rejection,

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Applicants amend paragraph [0015] to clarify that the fiducial information included in the database typified a PCB assembler with 2D coordinate location information for components to be assembled on the PCB, such as a common point to serve as a reference designator by which other points are assembled. The reference designator is a coordinate such as (0,0) that serves as the origin for a grid. Other 2D coordinate location information points such as, for example, (3,4), are located once the origin (0,0) is established. The Applicants believe that the rejection to claim 18 is hereby overcome. No new matter has been added.

Claim 19 is rejected because "said VRML database is partially comprised of rotation information for components be assembled on said PCB) is not clearly defined. In response to this rejection, Applicants amend paragraph [0015] to include that every components rotation information includes both the coordinate references for the location on a plane and each component size, shape, and relation to other components, such that a maximum number of components may fit in a designated area. As a function of coordinating the components and the respective rotation information. One skilled in the art will realize that it is constantly a goal of circuit design to maximize the amount of components for any given location, and it is common to include the aforementioned rotation information in a database for maximizing the use of any circuit board or portion of a circuit board. The Applicants believe that the rejection of Claim 19 is hereby overcome. No new matter has been added.

**In Response to the 35 USC 102 Claim Rejections:**

As mentioned, claims 1-4, 23, and 24 are rejected under 35 USC 102(b) as being unpatentable over Salmela. In response to this rejection, Applicants amend

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claim 1 to remove plurality of first image files and replace it with reference designator, XY location, rotation information, and package type. The Applicants further amend claim 1 such that the VRML interface software program compiles visual information from the reference designator, the XY location, the rotation information, and the package type and the VRML viewer plug-in.

According to the Office Action, Salmela teaches a functional and interactive 3D product design model for web-based environments. Further, the Office Action alleges that Salmela teaches development of shared virtual environments based on VRML plug-ins and a server. Also, according to the Office Action, an external authoring interface is required to enable interaction between the VRML model and the activator applet in the case of VRML plug-in viewer usage. Virtual components may be used to implement heterogeneous prototypes, which may consist of several simulation models running on different platforms. The Office Action suggests that this implies that there is at least one external database storing different file components. Further, Salmela allegedly concludes that a network environment may contain many workstations with differing operating systems, and it should therefore be possible to download and use the same tools in any workstation such that heterogeneous prototypes may be made including several simulation models running on different platforms.

Although the Applicants believe that claim 1 is allowable in its present form, they have amended it to include that the external database includes a reference designator, an XY location, rotation information, and package type for each of a plurality of components from the cancelled claims 17-19. This amendment clarifies that the source programs that these items are drawn from are highly tailored to a specific circuit

board rather than, as in the prior art, having information drawn from less specific programs. These specific elements of a specific board design allow identification of a circuit board such that data may be verified and specific parts may be identified on the board and references may be immediately checked from the board. Therefore because Salmela does not include at least one external database having a reference designator, an XY location, rotation information, and package type for each of a plurality of components stored from a compilation of the aforementioned information, claim 1 is believed to be allowable. Claim 23 also includes the aforementioned limitations and is believed to be allowable for at least this reason. Claims 2-4 depend from claim 1 and are believed to be allowable for at least the aforementioned reason, and claim 24 depends from the amended claim 23 and is also believed to be allowable for at least the aforementioned reason.

Claims 7-8 are rejected under 35 USC 103(a) as being unpatentable over Salmela in view of Engeldrum. According to the Office Action, the combination of Salmela and Engeldrum teach the limitations of claim 1 and further teach the combination of claims 7 and 8, including that the second image file is composed of JPG or GIF formats that can be viewed independent of a computer platform. In view of the amendments to claim 1, claims 7-8, which depend from the amended claim 1, are believed to be allowable for at least the reasons put forth regarding claim 1.

The Office Action has rejected claims 5-6, 9-15, and 20 under 35 USC 103(a) as being unpatentable over Salmela in view of Fujiwara. Claims 5 and 6 depend from the amended claim 1 and are believed to be allowable for at least the reasons discussed regarding claim 1. In response to the rejection of claims 9-15 and 20, claim 9 is amended to specify that the external database described therein stores a reference

designator, an XY location, rotation information and package type for each of a plurality of components instead of a plurality of first image files that were previously included therein.

According to the Office Action, Salmela teaches development of functional interactive 3D product design models for web-based environments. The Office Action recognizes that Salmela does not mention that it can be used for PCB manufacturing, however, according to the Office Action Fujiwara teaches this limitation. The Office Action further suggests that the other limitations of claim 9 are also included in the combination of Salmela and Fujiwara.

The Applicants respectfully submit that the amended claim 9 is nonobvious because the claims and the prior art differ. The system of Salmela is conventional in that it includes development of 3D production design models for web-based environments and is not, as pointed out in the Office Action, used for PCB manufacturing. The amended claim 9 now includes limitations (reference designator, XY location, rotation information, and package type) that are geared to a specific circuit board having specific components, such that during manufacturing an image of the board including the aforementioned files may be viewed easily by a user for facilitating circuit board engineering.

Further, the Fujiwara system is conventional in that it includes using CAD data for information about the detailed shape of the circuit board. More importantly, Fujiwara does not disclose or suggest differing software platforms including a reference designator for each of a plurality of components. The specific information, as claimed, allows the second image file to be tailored for PCB assembly, such that PCB assembly operators may easily troubleshoot the circuit boards. Because the prior art either alone

or in combination do not teach all the limitations in claim 9, it is believed to be allowable. Claims 10-15 and 20 depend from the amended claim 9 and are believed to be allowable for at least the aforementioned reason.

As mentioned, claims 16-19 are rejected under 35 USC 103(a) as being unpatentable over Salmela in view of Fujiwara and Powers. Claims 17-19 are cancelled. According to the Office Action, Salmela and Fujiwara teach the technology that enables development using VRML for web-based environment. The Office Action recognizes that neither Salmela nor Fujiwara teach the use of fiducials. The Office Action suggests that Powers teaches fiducials in analogous art.

The Applicants submit that it would not have been obvious to combine the Salmela and Fujiwara and Powers references to arrive at the present invention. No reason is shown when one of ordinary skill in the art would modify the Salmela, Fujiwara and Powers references as the Office Action proposes. The references are not pertinent to the problem of providing a transparent and inexpensive method for interfacing with an electronic assembly database as claimed by the Applicants. The Applicants' design is unique in that the fiducials included therein are used as fixed standards of reference for comparison or measurement by assembly operators assembling the PCBs from the second image file.

The Salmela reference is directed to enabling development of VRML for web-based environments. More importantly, however, Salmela does not disclose or suggest use of fiducials as claimed. Instead, the Salmela system is conventional in that it includes creating and viewing different image files from different computer platforms via VRML interface software programs and does not teach or suggest facilitating troubleshooting of the resultant prototypes.

The Fujiwara reference is directed towards a method and apparatus for checking mount quality of circuit boards. Fujiwara, however, does not disclose or teach use of fiducials or that the Fujiwara system would be in any way beneficial to web-based designs.

The Powers reference is directed to a system for creating and viewing 3D environments using symbolic descriptors. More importantly, Powers is not directed to nor does it disclose that the system included therein is in any way beneficial to a web-based system for circuit design. Further, no reason has been shown why it should be obvious to selectively combine the Salmela, Fujiwara, and Powers references to produce the claimed invention. Applicants' therefore submit that no motivation has been shown to combine the references as proposed.

"Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention absent some teaching, suggestion, or incentive supporting the combination." ACS Hospital Systems, Inc. v. Montefiore Hospital, 732 F.2D 1672, 1577, 221 USPQ 929,933 (Fed. Cir. 1984). Even if all the elements of Applicants invention are disclosed in various prior art references, the claimed invention taken as a whole cannot be said to be obvious without some reason given in the prior art when one of ordinary skill would have been prompted to combine the teachings of the references to arrive at the claimed invention. Further, any teaching or suggestion to make the claimed combination and the reasonable expectation of success therefor must both be found in the prior art, not in Applicants' disclosure. In re Vaeck, 947 F.2D 488, 20 USPQ2D 1438 (Fed. Cir. 1991). Therefore, because no teaching or suggestion is found in any of the references for a circuit board specific web-based design including



fiducials for referencing information, claim 15 is believed to be allowable for at least this reason. Claims 17-19 are cancelled.

Claims 4-6 are rejected under 35 USC 103(a) as being unpatentable over Salmela in view of Fujiwara and further in view of Engeldrum. According to the Office Action, Salmela and Fujiwara teach the technology that enables development using VRML for web-based environments. The Office Action recognizes that the combination of Salmela and Fujiwara do not teach JPG. However, the Office Action alleges that Engeldrum teaches JPG in analogous art.

Claims 4-6 depend from the amended claim 1 and are believed to be allowable for at least this reason.

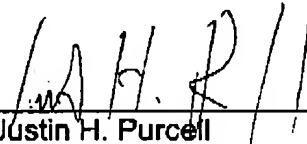
**Conclusions:**

In view of the aforementioned remarks, it is respectfully submitted that all pending claims are in a condition for allowance. A notice of allowability is therefore respectfully solicited. Please charge any fees required in the filing of this amendment to Deposit Account 50-0476.

Should the Examiner have any further questions or comments please contact the undersigned. Please charge any fees required in the filing of this amendment to deposit account 06-1510.

Respectfully submitted,

By: \_\_\_\_\_

  
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